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PROCEEDINGS

OF

THE ROYAL SOCIETY.

May 5, 1859.

Sir BENJAMIN C. BRODIE, Bart., President, in the Chair.

In accordance with the Statutes, the President read the following list of Candidates recommended by the Council for election into the Society:—

Samuel Husbands Beckles, Esq.
Frederick Crace-Calvert, Esq.
Henry J. Carter, Esq.
Douglas Galton, Esq.
William B. Herapath, M.D.
George Murray Humphry, Esq.
Thomas Sterry Hunt, Esq.
John Denis Macdonald, Esq.
William Odling, Esq.
Robert Patterson, Esq.
John Penn, Esq.
Sir Robert Schomburgk.
Thomas Watson, M.D.
Bennet Woodcroft, Esq.
Lieut.-Col. W. Yolland.

The following communications were read:—

I. "Propositions upon Arithmetical Progressions." By F. Elefanti, Esq. Communicated by Arthur Cayley, Esq. Received April 6, 1859.

(Abstract.)

The author sketches the investigation of the way of throwing various series of integer terms into arithmetical progressions, such as the sums of squares, cubes, &c. of figurate numbers, of the powers of a number, &c. He also gives the resolution of a given number,

in certain cases, into an arithmetical progression. Thus, having the theorem that N can be resolved into an arithmetical progression when 16 N+1 is a square, he is enabled to detect factors in N; he thus shows that 2079519603 has 43 and 101 among its factors. Among theorems which the method gives, may be noticed the following, as one of a peculiar and unstudied class. If in the series 1, 3, 5, 7, &c. four terms be taken, and the next *one* omitted, then the four next terms taken and the next *three* omitted, then four terms taken and *five* omitted, and so on, the four terms taken will in every case consist of numbers prime to one another.

II. Abstract of a Memoir "On the Electric Properties of Insulating or Non-conducting Bodies." By Professor Carlo Matteucci of Pisa. Communicated by Major-General Sabine, R.A., V.P. and Treas. R.S. Received April 14, 1859.

The object of the author in the first part of this memoir is to ascertain by experiment what condition is assumed by insulating or non-conducting bodies in the presence of an electrified body, and in what degree such condition is developed in insulating bodies of different kinds. In a memoir published nearly ten years ago (Ann. de Chim. et de Phys., xxvii. p. 134), he had shown that a cylinder of gum-lac, sulphur, stearic acid, or the like, suspended by a filament of silk, and brought near to a body charged with electricity, begins to oscillate in the same way as a cylinder of metal. The non-conducting cylinder, whilst under the influence of induction, behaves like any body charged with opposite electricities, and returns to its natural state when the induction ceases.

These experiments have now been very carefully repeated with cylinders formed of various insulating substances, made as nearly as possible of the same length and perfectly diselectrized. The air was rendered perfectly dry, and the inducing ball was charged with electricity to a constant degree, measured by the torsion-balance.

After giving a numerical statement of the time of oscillation and the moment of the induced force, as determined by experiment for cylinders of different insulating substances, and after describing other